Corporate governance, relationship lending and monetary lending monetary policy

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CORPORATE GOVERNANCE, RELATIONSHIP LENDING AND MONETARY POLICY:

Firm-Level Evidence for the Euro Area

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ABSTRACT

We show by means of a bank relationship model that after monetary policy tightening, public firms are more likely to decrease their demand for bank loans than private firms, which are typically more dependent on bank credit and benefit more from relationship lending. In order to test this hypothesis, we set up an empirical model relating the use of bank and other debt by private and public firms to an indicator of monetary policy (the short-term interest rate) and a set of firm-level control variables. Our estimation results, based on a sample of around 22,000 firms in the euro area plus the UK during most of the 1990s, yield evidence in favour of relationship lending, particularly for private and small firms.

Key words: Corporate governance, Relationship lending, Monetary policy

JEL codes: E52, G32

1 INTRODUCTION

According to recent insights in finance theory it is important to distinguish between different governance characteristics of firms, when analysing their financing behaviour (see Hart, 1995). At the same time, new views in monetary theory stress the differences in impact of monetary policy on various types and classes of firms (the so-called 'credit view', see e.g. Bernanke and Gertler, 1995). In this paper we deal with a mixture of these two viewpoints and investigate whether monetary policy has different impacts on the financing behaviour of firms with different corporate governance characteristics. Hence, we follow the line of research of the relationship between corporate finance and monetary policy set out by Oliner and Rudebush (1996a, 1996b) and Kashyap, Stein and Wilcox (1993, 1996). The analysis of the composition of external funds can shed light on the impact of monetary policy, especially by addressing the question whether firms are able to switch from bank loans to other sources of funds. This kind of analysis is carried out in this paper, using firm-level data for the euro area plus the UK. We analyse the composition of external funds of firms and the impact of monetary policy shocks. Our contribution is that we distinguish different corporate governance types of firms. As the ownership structure of firms varies widely over the world (La Porta, Lopez-de-Silanes, and Shleifer, 1999), and is an important determinant of capital structure decisions (Hart, 1995), we investigate whether corporate governance influences the effects of monetary policy on corporate financing decisions.

Our main interest focuses on the role of bank-firm lending relations. There are two views on the impact of monetary policy on firms' balance sheets. According to the credit view bank dependent firms are likely to be affected more by a monetary contraction than bank independent firms that have access to the capital market. The second view, the relationship lending view, argues that bank dependent firms are more likely to accept higher costs of borrowing because they benefit from the relationship with the banks. In our paper we basically test these two hypotheses for two governance structures of firms: private firms and public firms. Public firms generally have direct access to public capital markets and are therefore less bank dependent than private firms.

We use a sample consisting of individual firm data for eleven euro countries that joined the EMU right from the start, plus the U.K. We exploit the information in this dataset on the corporate governance characteristics of these firms. The following governance types of firms are included in our dataset: public and private corporations, and for the former group there is a distinction between quoted and unquoted public firms. About 98% of the firms in our sample are unquoted firms. Until now, most of the related literature has been using samples consisting of quoted firms (e.g. Wanzenried, 2002). In our opinion especially unquoted firms give rise to interesting governance and monetary transmission issues.

The paper is structured as follows. First we give our theoretical model in Section 2. Section 3 describes the data. In Section 4 we present the empirical set-up and in Section 5 we discuss its results. We summarize and conclude in Section 6.

2 THEORETICAL MODEL

In this section we present a simple theoretical model describing the capital structure of private and public firms. The main notion of the model is the difference between the adjustment of non-bank versus bank financing due to a change of the policy interest rate. We explicitly make a distinction between public and private firms, as we will explore these two classes of firms in the empirical part hereafter.[1]

We assume that any firm (either publicly or privately controlled) uses both bank and non-bank capital. Public firms are able to reveal more company information to financiers (such as banks) than private firms. Therefore the former are able to pay lower interest rates on loans than the latter. The reverse side of the medal is that banks value loans to these public firms lower than loans to private firms, because there are no additional gains of private information to extract from lending to the former (see Boot and Thakor, 2000). Indeed, if a bank does not have much options to collect more information than the average financier, it can not use this information to extract possible future profits. In that case banks will invest less in firm-specific information. Consequently, public firms benefit less than private firms from banking relationships in terms of a higher probability of being successful in carrying out the investment project by using the specific bank knowledge. So it is true that the public firm will probably pay a lower lending rate, but then it will also miss the additional benefits of a relationship loan. This view also has implications for the impact of monetary policy on bank borrowing by firms. If the monetary policy rate is raised so that banks face higher funding costs and are forced to increase the lending rate, public firms are likely to be the first to switch to the relatively cheaper non-bank financing. In contrast, privately owned firms, benefiting from bank relationships and having less access to non-bank forms of finance, will stick longer to bank loan financing.

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[1] We do not model the possible endogeneity of the choice between a public and a private corporate form, but simply assume that these two classes exist. This assumption seems justified by the statistical fact that firms only rarely change their legal status (only after a rapid growth period a private firm might want to go public).

In our model we have five agents: private firms, public firms, banks, investors, and a central bank. The core of our model is relationship lending in the view of Boot and Thakor (2000). We explain the benefits of relationship lending when discussing the differences between our two main classes of agents: public and private firms. Each firm is a collection of investment projects. Each project requires an investment of 1 (in whatever monetary unit). We suppose that public firms invest a fraction f_{pu} in projects that are financed with bank loans and a fraction $(1-f_{pu})$ which is financed with non-bank funds. Privately owned firms have a similar financial structure with f_{pr} of the projects bank financed and $(1-f_{pr})$ non-bank financed. We assume that $f_{pr}>f_{pu}$. The capital market financed project will yield a common payout of $Y>0$ with a probability q and $Y=0$ with probability $(1-q)$. q can be seen as a rating of the project. The costs of non-bank financing are equal to R, the capital market interest rate.

A bank financed project has a different feature. A bank can specialize in the project and increase the probability of success (see also Boot and Thakor, 2000). We assume that the firm gets a return from a bank financed project i of $Y>0$ with probability $q+(1-q)n_i$ and $Y=0$ with probability $(1-q)(1-n_i)$, where n_i is the additional probability of a successful investment due to the bank's support.[2] The implicit assumption is that it is more difficult for banks to increase the probability of success for projects with already good prospects than it is for projects with poor chances of success. Firms pay a premium of $p_i>0$ on top of the base lending rate which we assume to be equal to the capital market interest rate R (see also hereafter). This premium is the compensation for the services of banks offered to the firms. Banks invest in firm specific information, and with this information help to postpone liquidation, enhance the probabilities of good market returns, etc. Banks ask a premium p_i for this service on top of their funding rate (which we assume to be the capital market interest rate R). As the information gathering is more costly for a bank if it concerns a private firm than in the case of a public firm, the premium p_i will naturally be set higher for private firms than for public firms. Banks also pass through any change in the official interest rates, which we will assume to be a change in R: in case of an interest rate increase $dR>0$.[3] We assume perfect competition in the banking market. We will do this in a simple way by assuming perfect competition in supplying loans to public and to private firms separately (of course banks could cross-subsidize these

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[2] We assume that the number of projects k is sufficiently large: $i=1\ldots k$. Even projects with a low q benefit from the relationship lending variable $n_i>0$.

[3] In reality banks of course attract deposits at a lower interest rate R_d, but we will refrain from modelling an additional market.

activities). Investors invest in the capital market and supply funds to banks. They have no active role in our model and we will assume that they supply funds completely elastically.

The main focus of our model is on the sensitivity of the demand for bank loans to changes in the interest rate. For that purpose we have to model expected profits for the various firm projects. The expected profits from a non-bank financed project are:

$$E[P^F_{nb}] = q\,[Y-(1+R)] \qquad (1)$$

There is limited liability, which implies that only in positive return cases the loan is repaid. The expected profit from a bank financed project *i* are:

$$E[P^F_b] = [q + (1-q)n_i][Y-(1+R+p_i)] \qquad (2)$$

Investors supply capital in the non-bank capital market. Their expected returns on their investment in non-bank financed projects are equal to:

$$E[P^I_{nb}] = q\,(R+1)-1 \qquad (3)$$

Perfect competition implies that only firms with a profile $q > 1/(R+1)$ will get non-bank finance. Projects with a lower rating will have to rely on bank financing. We assume that both public and private firms have these projects. An increase in *R* leads to the famous lemons problem (Stiglitz and Weiss, 1981).

The profits banks make on financing project *i* are equal to:

$$E[P^B_b] = [q + (1-q)n_i]\,(1+R+p_i) - 1 \qquad (4)$$

Assuming perfect competition in the banking market (hence $E[P^B_b] = 0$), it follows that:[4]

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4 We assume perfect competition in banking for the sake of simplicity. See Boot and Thakor (2000) for a model of imperfect competition in banking. Incorporation of imperfect competition in banking would not change the main thrust of our analysis, it would only change relative magnitudes.

$$n_i = q/(q-1) + 1/[(1-q)(1+R+p_i)] \quad (5)$$

Equation (5) illustrates that in equilibrium the benefits firms enjoy from bank relationships are inversely related to the interest rate premium they have to pay for it. Substituting this expression into the equation of firm profits from a bank financed project (2) gives:

$$E[P^F_b]=[Y-(1+R+p_i)]/(1+R+p_i) \quad (6)$$

From $Y>0$ follows that:

$$dE[P^F_b]/dR= -Y / (1+R+p_i)^2<0, \quad (7)$$

According to this result the profitability of bank financed projects for firms depends negatively on changes in the capital market interest rate. If we define a change of monetary policy as dR, bank financed projects become less profitable to the firms. This leads us to our basic proposition:

Proposition: Bank financed projects of private firms are less sensitive to monetary policy shocks than bank financed projects of public firms.

Proof: Equation (7) reveals that if the p_i for privately owned firms is higher than the p_i for publicly owned firms (which is reasonable to assume), the elasticity of the profitability of bank financed projects of private firms is smaller in absolute value than that of public firms.

The proposition contradicts the basic intuition of the credit view, which predicts that a monetary policy induced increase of the lending rate leads to a negative balance sheet effect for bank financed projects. For private firms this negative balance sheet effect is stronger because these firms are more dependent of bank credit. This hypothesis will be tested against the relationship lending hypothesis in Section 4.

3 DATA

The source of the company data is 'AMADEUS' of Bureau van Dijk, containing profit and loss account and balance sheet data, as well as number of employees, legal form, etc., for European firms. We use data for the EMU-11 countries that adopted the euro in 1999, and the UK. We filter the data in several ways.

First, firms are selected on a consolidated level. Only when consolidated data are not available in the file, unconsolidated data are used. This selection procedure avoids double inclusion of firms with both consolidated and unconsolidated data. We merge several files each containing five years of data into one dataset for the period 1990-1997. We select companies with two-digit ISIC-codes equal to 15-37, 45, 50-52, 55, 60-63; these are firms with activities in manufacturing, construction, trade, and transportation.

Table 1 gives the country representation of our sample. It also gives the number of firms by governance type. About 55% of the companies in the sample are public firms, and 45% are private firms. The main governance characteristics of these two types of firms are summarised in Table 2. Public firms offer shares to the public; these shares can be quoted on a stock exchange or not. Their liability is limited. Private firms do not offer shares publicly but privately. The liability of the shareowners is extended.[5] In general, the equity ownership of public firms is dispersed, while that of private firms is concentrated. To compensate for the differences in liability, reporting and disclosure requirements for public firms are more binding than for private firms. Also the minimum share capital requirements are higher for public firms. The requirements for quoted public firms are even more severe. Only 2% of the firms in the sample have quoted shares. A priori it can not be concluded whether private firms are more or less safe for investors or creditors than public firms.

Table 3 gives the liability composition for the firms in the sample. We observe that private firms have more bank debt on their balance sheet than public firms. They have almost twice as much short-term bank loans. This implies that private firms are more bank dependent than public firms, which coincides with the theoretical assumptions made in Section 2. This makes the sample split into public and private firms especially interesting, as it facilitates an exploration of the effect of corporate governance characteristics of firms such as bank dependency. This distinction is different from the large-small firm dichotomy more commonly found in the literature. As a matter of fact, the table shows that public firms in our sample are not significantly larger than private firms. Medians for total assets are comparable, while median employment is higher for private firms. Quoted firms are of course much larger than average, and

[5] To give some examples of public and private firms, respectively, for the larger EMU countries: ‘SA’ and ‘SARL’ in France, ‘AG’ and ‘GmbH’ in Germany, ‘SpA’ and ‘Srl’ in Italy, ‘SA’ and ‘SL’ in Spain, ‘Plc’ and ‘Ltd’ in the UK, and ‘NV’ and ‘BV’ in the Netherlands.

therefore they are considered separately in the analysis. As has been mentioned before, they form only a small proportion of the sample.

4 EMPIRICAL MODEL

Our main research question is whether the impact of monetary policy shocks on the financing behaviour of firms is dependent on the corporate governance characteristics. Concerning the capital structure we focus on five debt ratios:

- Total debt to total assets, *DEBT*. This is a common measure for leverage;
- Bank debt to total assets, *BANK*, as our main focus is on the special role of bank debt;
- Long-term bank loans to total assets, *LTBANK*;
- Short-term bank loans to total assets, *STBANK*. We distinguish short and long-term bank loans in order to address maturity choices;
- Trade credit to total assets, *TRADE*. This is a component of working capital which in the literature receives a lot of attention for its substitutability with bank debt (e.g. Petersen and Rajan, 1997).

We estimate models similar to e.g. Oliner and Rudebush (1996a), of the type :

$$Y_{it} = a\, X_{it} + b\, MPI_{jt} + g\, MPI_{jt}*GOV_i + e_{it} \qquad (8)$$

Y_{it} = one of the above mentioned debt ratios of firm i in year t;

X_{it} = control variables, explaining capital structure choices of firms;

MPI_{jt} = Monetary Policy Indicator for resident country j in year t, for which we use the short-term interest rate;

GOV_i = dummy variable for the governance type of firm, one dummy *PRIVATE* which is 1 for private firms and 0 for public firms and another dummy *QUOTED* which is 1 for quoted firms and 0 for unquoted firms;

e_{it} = residual.

We include control variables *X* to control for idiosynchratic effects on capital structure decisions. These are explanatory variables that are often used in the literature to explain debt ratios, namely: interest expenses *INT*, the presence of tangible assets *TAN* and intangible assets *INTAN*, firm size *SIZE*, depreciation *DEPR*, and earnings before interest and taxes *EBIT*.[6] All these control variables are expressed as ratios to total assets, except firm size which is the logarithm of total assets itself. The direct effect of monetary policy on the capital structures of firms is measured by b. The differential effects of monetary policy for particular governance types of firms is captured by g. More specifically, we include two dummy variables, one for private firms and another for quoted firms, *PRIVATE* and *QUOTED*, respectively. The interaction of the monetary policy indicator with these governance dummy's serves the purpose to assess whether monetary policy affects private firms and quoted firms differently from public firms and unquoted firms. Fully written out the equation reads:

$$Y_{it} = \alpha_1 INT_{it} + \alpha_2 TAN_{it} + \alpha_3 INTAN_{it} + \alpha_4 SIZE_{it} + \alpha_5 DEPR_{it} + \alpha_6 EBIT_{it} + \beta MPI_{jt-1} + \gamma_1 MPI_{jt-1}*PRIVATE_i + \gamma_2 MPI_{jt-1}*QUOTED_i + \varepsilon_{it} \quad (9)$$

Our priors with respect to the expected signs of the coefficients of the control variables follow from the capital structure literature.

- *INT*: High interest expenses may be an indicator of financial distress and/or imply the presence of a large debt tax shield. Both interpretations lead to the expectation of a negative coefficient of interest expenses. However, there obviously is also a positive causality running from debt to interest expenses. Hence, the sign of coefficient α_1 is a priori uncertain. The latter endogeneity problem is taken up again below when discussing estimation issues.
- *TAN*: A high proportion of tangible assets on the balance sheet may stand for ample presence of collateral, which makes the access to debt easier. Hence coefficient α_2 is expected to be positive.
- *INTAN*: A high proportion of intangible assets on the other hand denotes lower collateral value, and hence the coefficient α_3 is expected to be negative. Intangible investment is also considered to be a proxy of high growth opportunities for the firm. High growth options should, according to agency theory, negatively influence the use of debt, and hence also imply a negative sign for this coefficient.

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6 See Harris and Raviv (1991), Rajan and Zingales (1995), Ramb (2000).

– *SIZE*: Large sized firms are well known to the outside investors and well diversified so that they have fewer asymmetric information problems on the capital market and run lower business risks, respectively. Therefore, size is expected to be positively related to the use of debt, i.e. coefficient a_4 should be positive.

– *DEPR*: A high depreciation rate implies the presence of large non-debt tax shields, making the use of debt tax shields relatively redundant. Hence, coefficient a_5 is expected to be negative.

– *EBIT:* According to the pecking order theory firms prefer internal finance over external finance including debt. High earnings enable firms to finance their investment largely with retained earnings, so that substantial debt finance is not necessary. Hence, coefficient a_6 is expected to be negative.

Our priors with respect to the monetary policy indicator and its governance interaction terms are as follows.

– *MPI*: The traditional money view on monetary policy transmission focuses on the interest rate channel. A monetary policy induced rise of the short-term interest rate reduces both interest sensitive investment spending and the corporate demand for bank debt. However, this interest rate channel can have different implications for debt of various maturity. It is probable that short-term debt will be reduced after a monetary policy induced short-term interest rise, but it is not so clear for long-term loans. The credit view on monetary policy transmission puts on stage the broad credit channel, in fact consisting of two channels, namely the credit channel and the lending channel (Bernanke and Gertler, 1995). These channels enhance the negative effects of monetary policy tightening. According to the lending channel theory monetary policy tightening constrains the supply of bank credit, which exerts an additional negative effect for bank dependent firms. Through the credit channel additional negative real effects originate from the deterioration of the balance sheet positions of firms that is caused by the increase of the interest rate. In sum, for short-term loans all these channels lead to the expectation of a negative coefficient for the monetary policy indicator b. For long-term loans however the expected sign for this coefficient is ambiguous.

– *MPI*PRIVATE*: The interaction term of the monetary policy indicator with the private firm dummy has been included to capture the possibility that private firms adjust their capital structures after a monetary policy shock in a different way than the average firm. We have observed (Section 3) that private firms are more dependent on bank credit than public firms. This may reflect the fact that public firms, being better known to the outside investors as a result of more intense disclosure, suffer less from asymmetric information problems than their private counterparts and therefore have easier

access to the public capital market. True or not, the implications of this assumption for the sign of coefficient g_1 are ambiguous. It may depend which theory one adheres to: the credit view or the relationship lending view (see Section 2). When one assumes the credit view, it is to be expected that private firms are hit more severely by restrictive monetary policy shocks which lead to a decreasing supply of bank credit. In that case coefficient g_1 is expected to be negative. On the other hand, when one assumes the relationship lending view, it is the private firms which apparently benefit most from building and maintaining long-term banking relationships. In that case it is to be expected that private firms are ready to pay more for bank loans in times of monetary tightness, while public firms diminish their demand for bank loans and switch to other forms of finance. If this is true coefficient g_1 is expected to be positive.

– *MPI*QUOTED*: For the interaction term of the monetary policy indicator with the quotation dummy the reasoning goes analogously. Quoted firms are mostly very large public firms which comply to the relatively severe disclosure and capital requirements which are conditional for acquiring quotation on the stock exchange. Therefore, we assume that our earlier argumentation for the public firms in terms of easier access to the public capital market applies a fortiori for quoted firms. Hence, we expect coefficient g_2 to be positive under the credit view hypothesis and to be negative under the relationship lending hypothesis.

Summarising, our priors with respect to the signs of the coefficients in equation (9) are:

$$Y_{it} = a_1 INT_{it} + a_2 TAN_{it} + a_3 INTAN_{it} + a_4 SIZE_{it} + a_5 DEPR_{it} + a_6 EBIT_{it} + b MPI_{jt-1} + g_1 MPI_{jt-1}*PRIVATE_i + g_2 MPI_{jt-1}*QUOTED_i + e_{it}$$

– $a_1 = ?;\ a_2 > 0;\ a_3 < 0;\ a_4 > 0;\ a_5 < 0;\ a_6 < 0$

– Credit view: $b_1 < 0;\ g_1 < 0;\ g_2 > 0$

– Relationship lending view: $b_1 < 0;\ g_1 > 0;\ g_2 < 0$

5 ESTIMATION RESULTS

Before presenting our estimation results, we discuss two econometric issues. First, the error term, e_{it}, in equation (9) is assumed to consist of a time-invariant error component u_i plus an idiosyncratic error term v_{it}, hence: $e_{it} = u_i + v_{it}$. For u_i fixed or random effects can be assumed. We tested whether fixed or random effects were preferable using the Hausman specification test, which resulted in a fixed effects

specification. Second, some of the explanatory variables are suspected to be endogenous, notably *INT*. Clearly, a high debt ratio causes high interest payments. Therefore, standard panel data estimators cannot be used and an instrumental variables panel data estimator should be applied. We use the two-stage-least-squares fixed-effects (or within) estimator.[7] *INT* is instrumented by all other right-hand side variables plus the ratio of cash to total assets and the ratio of stocks to total assets.

Table 4 presents correlation coefficients for the model variables. There are several remarks to be made. First, the correlations between the total debt ratio and its components are all positive, although the correlation is rather weak with long-term bank debt. Second, looking at the correlations between the debt components, trade debt appears to be negatively correlated with bank debt, both short-term and long-term. This suggests substitution between bank and trade debt. Third, as concerns the correlations between the debt components and the control variables in the model, it is noteworthy that the signs of the correlations of *TAN*, *INTAN*, *SIZE* and *DEPR* with total bank debt and with long-term bank debt are opposite from the correlations with the other debt components. Hence, long-term bank debt appears to behave differently from the other debt types. For *INT* and *EBIT* the correlations with the debt ratios are consistently positive and negative, respectively. The correlations of *MPI* with the debt components are mostly positive, with the exception of long-term bank debt, and they are generally relatively small.

Table 5 gives the results of the estimation of equation (9) for the five debt ratios which are introduced above. Before focusing on the monetary policy effects, let us first discuss the control variables. Most of these are highly significant, and when significant they have the expected signs. Exceptions are the coefficients of *TAN*, which are found to be negative instead of positive for all debt types except long-term bank debt. The signs of the coefficients of *INTAN* is found to be negative, as was expected, except for, again, long-term bank debt. Hence, long-term bank debt appears to behave differently from other debt types, as was already conjectured from the simple correlations discussed above. *SIZE* has a positive relationship with all debt types, as was expected, except with trade debt, where the influence is opposite. Small-sized firms apparently make more use of trade debt than large firms. For both *DEPR* and *EBIT* the expected negative coefficients are found.

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[7] See Baltagi (1995) for an introduction to panel data models with endogenous covariates.

Our main focus is on the effects of monetary policy, hence on the coefficients of *MPI* and its cross-terms with the governance characteristic dummy variables *PRIVATE* and *QUOTED*. From the estimated coefficients of *MPI* we conclude, first, that the signs of the coefficients of *MPI* are significant and negative in the equations for total debt, short-term bank debt and trade debt, but significantly positive in the equations for total bank loans and long-term bank loans. Hence, a significant decrease of firms' debt ratios occurs after monetary policy tightening, particularly for total debt, short-term bank debt and trade debt. In contrast, for total bank loans and long-term bank loans an increase of the debt ratios is found. Hence, it seems to be the case that when the short-term interest rate has been raised, firms rearrange their debt maturity structure towards the long side.

Looking at the coefficients of the cross-term *MPI*PRIVATE*, we can deduct from the significantly positive values in the equations for total debt, short-term bank debt and trade debt that the negative monetary policy impact is smaller for private firms than for public firms. As for short-term bank loans in particular this finding could be interpreted as evidence for the lending relationship view. Hence, these results are in favour with our theoretical model.

Finally, the coefficients of the cross-term *MPI*QUOTED* are insignificant in all equations, hence quotation does not seem to matter according to this analysis. This may be due to the rather small number of quoted firms in our sample.

We re-estimated the equations for subsamples. For reasons of space, Table 6 only gives the estimated coefficients for *MPI* and the two cross-terms with the corporate governance dummy variables. (The results for the control variables are qualitatively comparable to Table 5). The first two subsamples consist of the top 33 percentiles and the bottom 33 percentiles of the size distribution, respectively, where size is measured by *SIZE*. The general picture that emerges for the whole sample in Table 5 is more or less confirmed in Table 6 for small firms, but not for large firms. In particular, the results for the equation for short-term bank debt for the subsample of small firms show that the use of short bank loans declines after monetary policy tightening but not so much for private firms as for public firms. The effects for short-term bank loans are not significant in the large firms subsample. Hence, these results suggest that the relationship lending hypothesis does not play as much a role for large firms as it does for small firms. In other words, small and private firms appear to maintain long-term banking relationships more than large

and public firms do. This may be related to the fact that large and public firms have easier access to the public capital markets and thus have more alternatives available for bank credit.

The third and fourth subsamples consist of the top 33 percentiles and the bottom 33 percentiles of the leverage distribution, respectively, where leverage is measured by *DEBT*. The results indicate that the positive response of the long-term bank debt ratios to monetary policy tightening, which was already observed for the whole sample in Table 5, appears to be especially relevant for the high-leveraged firms. Apparently, these high leveraged firms benefit relatively much from a rearranging of their debt maturity structure towards longer terms when short-term interest rates have been raised. The significantly positive coefficient of *MPI*QUOTED* in the equation for long-term bank debt suggests that quotation makes it easier for high-leveraged firms to restructure the maturity structures of their debt in such a way.

6 CONCLUSION

In this paper we analyse the response of the financing behaviour of firms to changes in monetary policy. Our focus is on the differential responses of the following governance types of firms: private versus public firms, and quoted versus non-quoted firms. Our sample consists of these types of firms for the EMU-11 and the UK for the period 1990-1997.

The main conclusions of the analysis are the following:

- A significant decrease of firms' debt ratios occurs after monetary policy tightening. This is particularly the case for total debt, short-term bank debt and trade debt. In contrast, for total bank loans and long-term bank loans an increase of the debt ratios is found. Hence, it seems to be the case that when the short-term interest rate has been raised, firms reshuffle their debt maturity structure towards the long side.
- The negative monetary policy effects on total debt, short-term bank debt and trade debt are significantly smaller for private firms than for public firms. This finding can, particularly with respect to short-term bank loans, be interpreted as evidence for the relationship lending view. Hence, these results are in favour with our theoretical model.
- A sample split into small and large firms yields results that suggest that the relationship lending hypothesis does not play as much a role for large firms as it does for small firms. Hence, small and private firms appear to maintain long-term banking relationships more than large and public firms do.

This may be related to the fact that large and public firms have easier access to the public capital markets and thus have more alternatives available for bank credit.

- Another sample split into low and high-leveraged firms shows that the rearranging of the debt structure towards longer maturity after a short-term interest rate rise is especially relevant for high-leveraged firms. These firms of course benefit the most from this maturity restructuring. Further, the results indicate that quotation makes it easier for high-leveraged firms to restructure the maturity structures of their debt.

These conclusions may be an important qualification of the credit view. The latter predicts that a negative monetary policy shock results in an increase of the lending rates and/or a decrease of the supply of bank loans and therefore a cut in investment by bank dependent firms in particular. However, our results show that, although we do not claim to have anything to say about the credit channel effects on investment or the user costs of capital, it appears to be the case that particularly bank dependent firms tend to stick to bank borrowing as they benefit from banking relationships. In our case such firms are private firms, which are relatively bank dependent.

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Table 1 Number of firms in the sample

	Public firms	*Of which: Quoted*	Private firms	All firms
Austria	81	*4*	54	135
Belgium	4641	*24*	380	5021
Finland	1368	*22*	0	1368
France	12525	*113*	1859	14384
Germany	358	*94*	1138	1496
Ireland	36	*23*	177	213
Italy	6144	*35*	3543	9687
Luxembourg	77	*0*	28	105
Netherlands	304	*138*	2552	2856
Portugal	708	*31*	458	1166
Spain	5464	*37*	548	6012
Total EMU-11	31706	*521*	10737	42443
United Kingdom	1883	*938*	15318	17201
Total sample	33589	*1459*	26055	59644

Table 2 Corporate governance characteristics

Type	*Shares offerings*	*Ownership*	*Liability of shareholders*	*Share capital, Shareholders, Disclosure*
Public firms (quoted or not quoted)	Public	Dispersed	Limited	High minimum requirements
Private firms	Private	Concentrated	Extended	Low minimum requirements

Table 3 Capital structure by governance type
Ratios of total assets; aggregate averages for 1990-1997

	Public firms	Of which: Quoted	Private firms	All firms
Equity	0.32	0.38	0.32	0.32
Long-term bank debt	0.12	0.14	0.12	0.12
Other noncurrent liabilities	0.14	0.11	0.09	0.12
Noncurrent liabilities	0.26	0.25	0.20	0.24
Short-term bank debt	0.11	0.08	0.21	0.14
Trade credit	0.15	0.12	0.11	0.13
Other current liabilities	0.17	0.18	0.16	0.17
Current liabilities	0.43	0.40	0.47	0.44
TOTAL LIABILITIES	1.00	1.00	1.00	1.00
Memo items:				
Total bank debt	0.23	0.22	0.33	0.26
Other debt	0.46	0.51	0.36	0.42
Median total assets (million euros)	11.3	67.6	10.7	11.2
Median number of employees	90	793	128	106

Table 4 Correlation coefficients

	DEBT	*BANK*	*LTBANK*	*STBANK*	*TRADE*
DEBT	1.000				
BANK	0.407	1.000			
LTBANK	0.188	0.627	1.000		
STBANK	0.345	0.694	-0.125	1.000	
TRADE	0.420	-0.332	-0.274	-0.170	1.000
INT	0.371	0.469	0.209	0.404	-0.053
TAN	-0.115	0.247	0.374	-0.032	-0.350
INTAN	-0.053	0.080	0.143	-0.030	-0.119
SIZE	-0.156	0.070	0.101	-0.005	-0.387
DEPR	-0.100	0.044	0.177	-0.108	-0.180
EBIT	-0.229	-0.142	-0.068	-0.117	-0.086
MPI	0.107	0.012	-0.092	0.100	0.032

Table 5 2SLS Within Estimation results for whole sample

Y_{it} =	$DEBT_{it}$	$BANK_{it}$	$LTBANK_{it}$	$STBANK_{it}$	$TRADE_{it}$
INT_{it}	3.962 *	2.330 *	-0.082	2.457 *	1.677 *
	(15.25)	(6.78)	(0.89)	(7.47)	(6.57)
TAN_{it}	-0.127 *	-0.010	0.233 *	-0.142 *	-0.186 *
	(14.67)	(0.89)	(13.91)	(13.35)	(21.60)
$INTAN_{it}$	-0.122 *	-0.043 *	0.115 *	-0.080 *	-0.213 *
	(13.89)	(2.10)	(4.40)	(4.12)	(13.58)
$SIZE_{it}$	0.067 *	0.058 *	0.028 *	0.045 *	-0.012 *
	(30.66)	(19.27)	(7.31)	(14.87)	(5.30)
$DEPR_{it}$	-0.308 *	-0.341 *	-0.199 *	-0.216 *	-0.069 *
	(13.73)	(11.74)	(4.34)	(8.12)	(3.08)
$EBIT_{it}$	-0.397 *	-0.378 *	-0.155 *	-0.378 *	-0.089 *
	(36.21)	(25.08)	(10.13)	(23.89)	(8.31)
MPI_{t-1}	**-0.213 ***	**0.486 ***	**0.564 ***	**-0.441 ***	**-0.422 ***
	(3.96)	(6.48)	(4.31)	(5.99)	(7.83)
MPI_{t-1}*$PRIVATE_i$	**0.147 ***	**-0.296 ***	**0.104**	**0.061 ***	**0.137 ***
	(4.98)	(7.78)	(1.43)	(1.97)	(4.59)
MPI_{t-1}*$QUOTED_i$	**0.100**	**-0.019**	**0.163**	**0.198**	**-0.132**
	(0.77)	(0.11)	(0.96)	(1.30)	(1.00)
R^2	0.101	0.12	0.06	0.15	0.07
Number of obs.	81,809	77,139	35,134	70,574	82,574
Number of firms	22,813	22,115	14,944	21,323	22,960

Note: *t*-values are given within parentheses below the coefficients; * denotes their statistically significance at a confidence level of 95% or higher.

Table 6 2SLS Within Estimation results for four subsamples: selected MPI coefficients

Y_{it} =	$DEBT_{it}$	$BANK_{it}$	$LTBANK_{it}$	$STBANK_{it}$	$TRADE_{it}$
Subsample 1: Large firms (top 33 percentile with respect to *SIZE*)					
MPI_{t-1}	**-0.677** *	**0.107**	**0.030**	**-0.291**	**-0.432** *
	(5.23)	(0.67)	(0.13)	(1.81)	4.98
MPI_{t-1}*$PRIVATE_i$	**0.058**	**-0.112**	**0.293** *	**-0.002**	**0.087** *
	(0.90)	(0.11)	(2.56)	(0.04)	2.00
MPI_{t-1}*$QUOTED_i$	**0.076**	**-0.006**	**0.154**	**0.091**	**-0.089**
	(0.41)	(0.03)	(0.80)	0.55	0.70
Number of firms	7931	7745	5631	7483	7990
Subsample 2: Small firms (bottom 33 percentile with respect to *SIZE*)					
MPI_{t-1}	**0.056**	**0.825** *	**0.882** *	**-0.654** *	**-0.202** *
	(0.72)	(6.60)	(3.97)	4.77	2.05
MPI_{t-1}*$PRIVATE_i$	**0.245** *	**-0.571** *	**-0.171**	**0.292** *	**-0.021**
	(4.62)	(7.57)	(0.92)	3.74	0.31
MPI_{t-1}*$QUOTED_i$	**-1.373** *	**-1.453** *	**0.156**	**-1.279**	**-0.863**
	(2.82)	(2.08)	(0.08)	1.66	1.38
Number of firms	6242	6000	3852	5750	6295
Subsample 3: High-leveraged firms (top 33 percentile with respect to *DEBT*)					
MPI_{t-1}	**0.361** *	**0.865** *	**0.821** *	**-0.174**	**0.095**
	6.75	5.81	2.34	1.27	0.92
MPI_{t-1}*$PRIVATE_i$	**0.049**	**-0.421** *	**-0.015**	**-0.010**	**0.106** *
	1.76	6.45	0.09	0.17	2.14
MPI_{t-1}*$QUOTED_i$	**0.581** *	**1.073** *	**1.421** *	**0.000**	**-0.201**
	2.76	2.07	2.04	0.00	0.48
Number of firms	8800	8686	5119	8472	8972
Subsample 4: Low-leveraged firms (bottom 33 percentile with respect to *DEBT*)					
MPI_{t-1}	**-1.123** *	**0.038**	**-0.118**	**-0.680** *	**-0.827** *
	6.06	0.26	0.70	4.49	7.98
MPI_{t-1}*$PRIVATE_i$	**0.326** *	**-0.060**	**0.075**	**0.207** *	**0.076**
	2.28	0.55	0.57	1.96	0.96
MPI_{t-1}*$QUOTED_i$	**-0.424**	**-0.323**	**-0.052**	**-0.128**	**-0.383**
	1.18	1.30	0.25	0.53	1.94
Number of firms	5480	5145	3832	4837	5471

Note: *t*-values are given within parentheses below the coefficients; * denotes their statistically significance at a confidence level of 95% or higher.